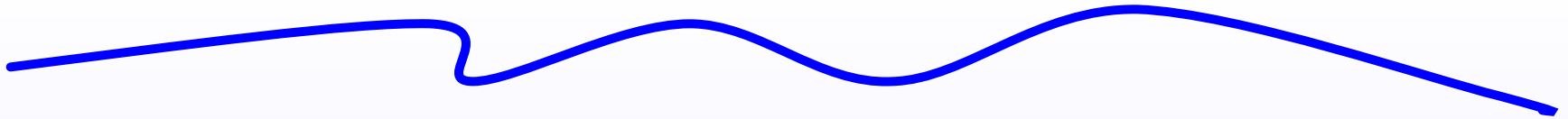


SAM Forum & Symposium

Field Evaluation of UST Systems



Shahla Farahnak & Erin Ragazzi

State Water Resources Control Board

September 25, 2002

Presentation Outline



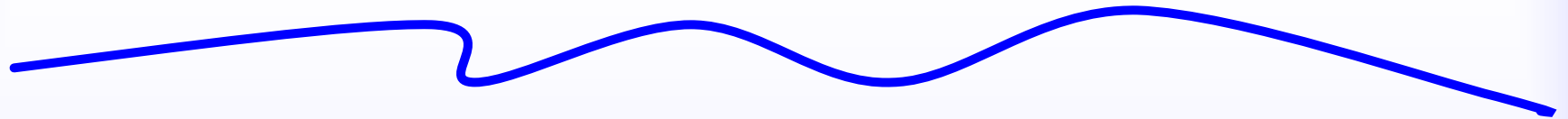
- Background/Chronology
- Third-Party Certification
- Enhanced TracerTight® Test Method
- Field-Based Research (FBR) Project
- Other Field Evaluations

Background



- December 22, 1998 upgrade deadline
- Concern over detections of MTBE
- Governor Wilson's October 1997 signing message for SB 521, SB 1189, & AB 592 directing SWRCB convene advisory panel
- Advisory Panel Report on the Leak History of New & Upgraded UST Systems (January 1999)
- Senate Bill 989 (Stats. 1999, Ch. 812)

Leak Detection Method Certification



US EPA, Nationwide, & State
Standard Test Procedures & Evaluation

Third-Party Certification



- Leak detection test methods are third-party certified against their ability to detect a specific leak rate
- Minimum performance standards
 - Probability of detection of at least 95%
 - No more than a 5% false alarm rate

Test Method Evaluation

US EPA Standard



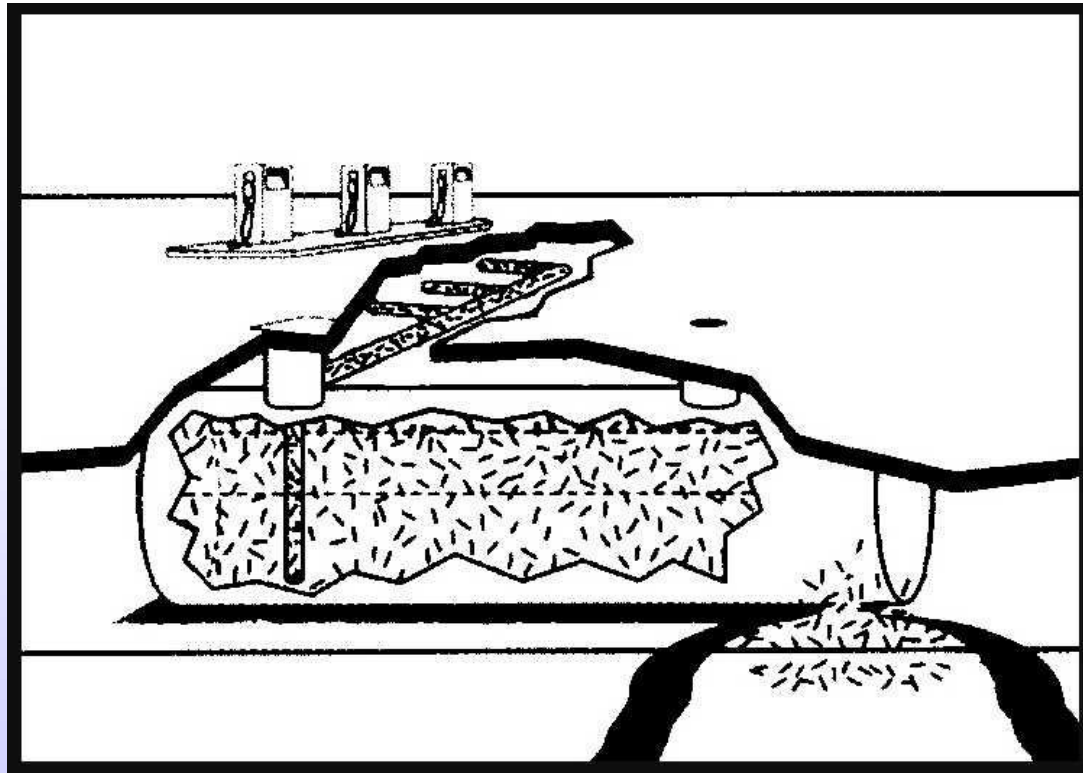
- Testing according to US EPA Testing Protocol, "Standard Test Procedures for Evaluating Leak Detection Methods: Nonvolumetric Tank Tightness Testing Methods" (March 1990)
 - Testing left to equipment manufacturer & third-party testing organizations
 - Provides uniform nationwide test standard for manufacturers, consumers, & regulators

Tracer Test Method Evaluation National & State Regulators



- Reviewed by National Work Group on Leak Detection Evaluations
- Included in local guidance (LG) letter 113-116 (contains California approved leak detection methods)

Enhanced Tracer Tight® Test Method



Also Known As
Enhanced Leak Detection

Enhanced Tracer Tight® Test Method

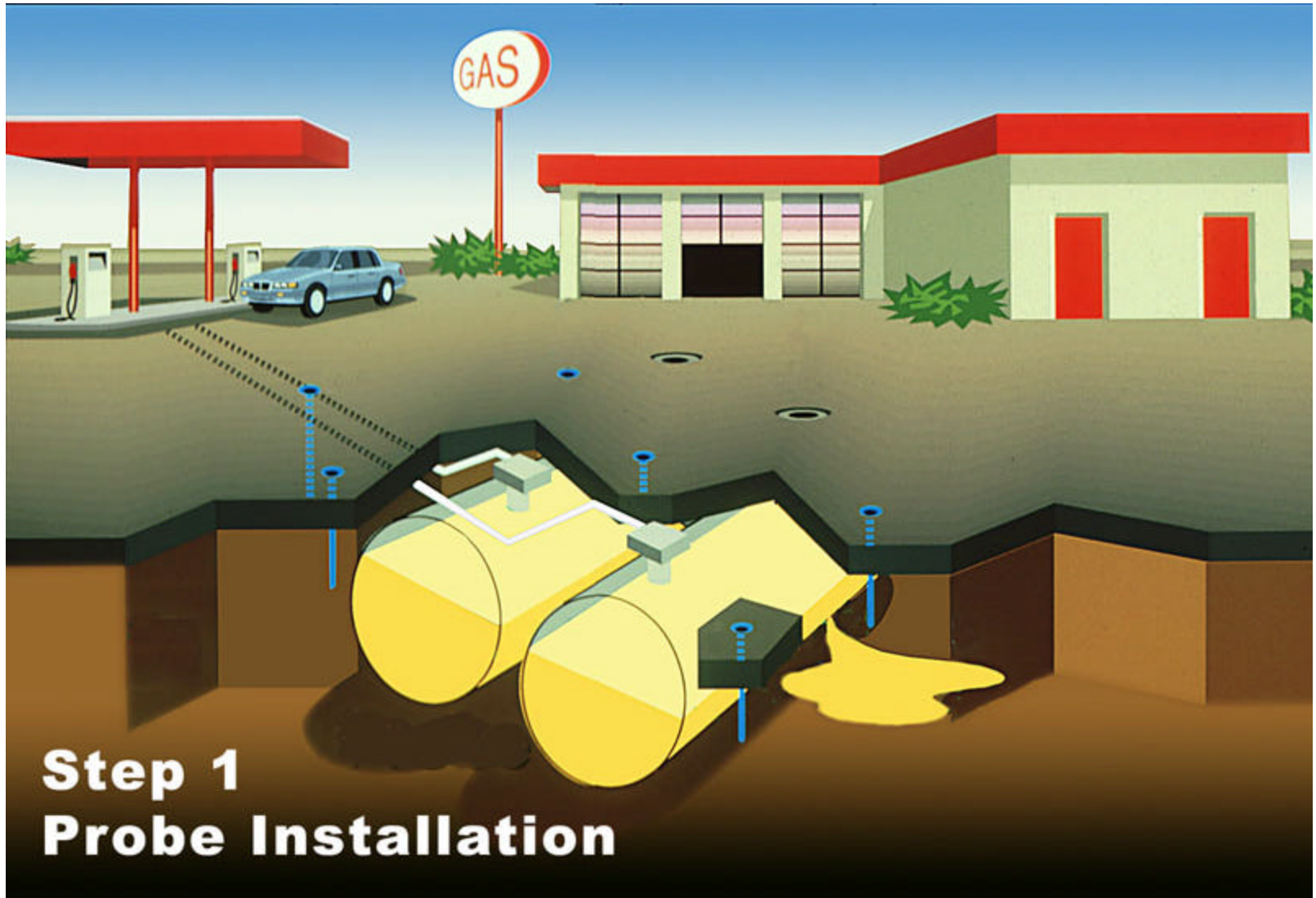


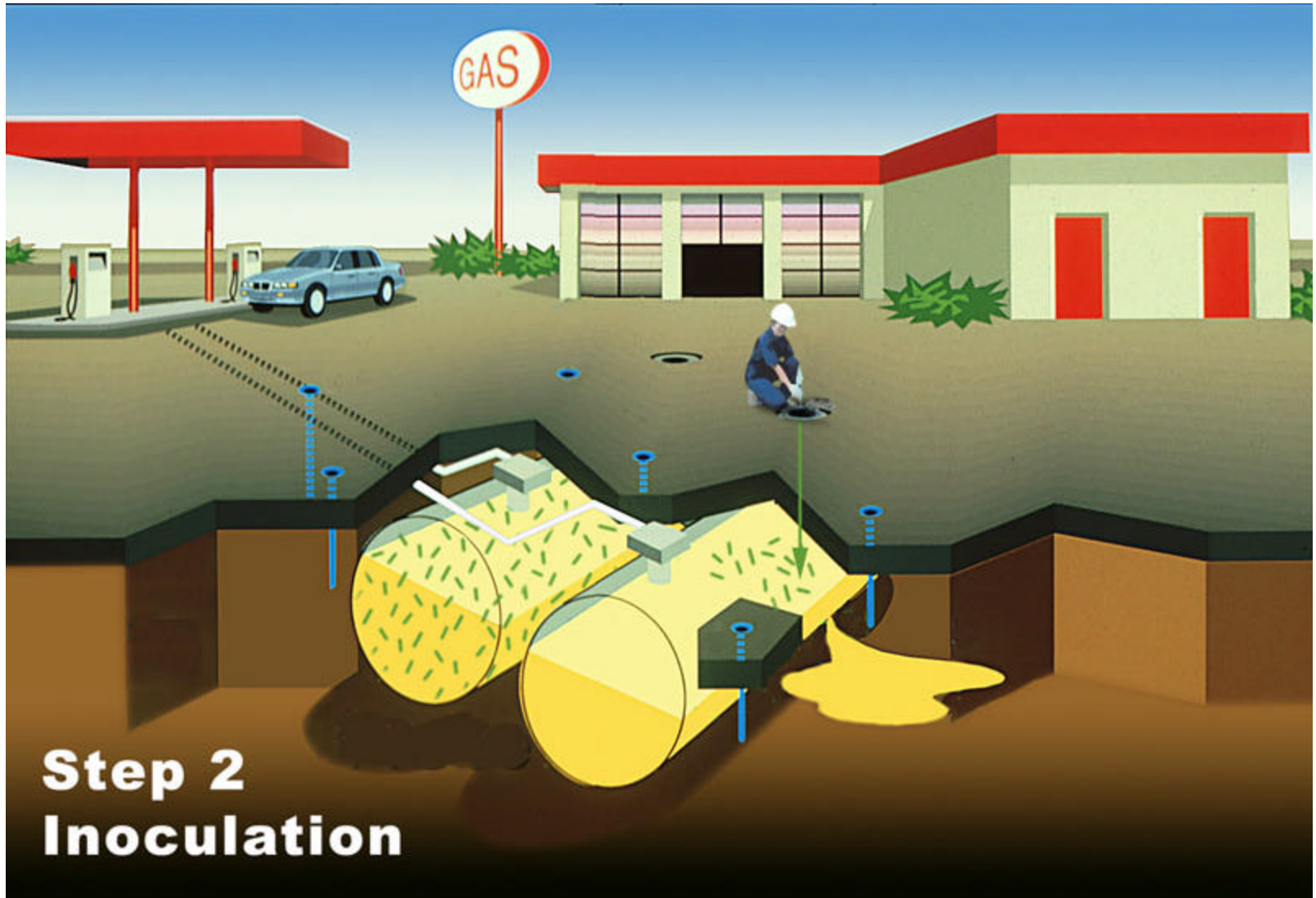
- Test method determines integrity of UST system by introduction and external detection of a substance that is not a component of the fuel formulation stored in UST system
- Capable of detecting both vapor and liquid releases from UST system

Enhanced Tracer Tight® Test Method



- Very sensitive (capable of detecting a leak rate of at least 0.005 gph)
- Distinguishes a new release from an old release; Tracer not typically present at UST facilities
- Differentiates a vapor release from a liquid release; Evaluates hydrocarbon and tracer concentrations

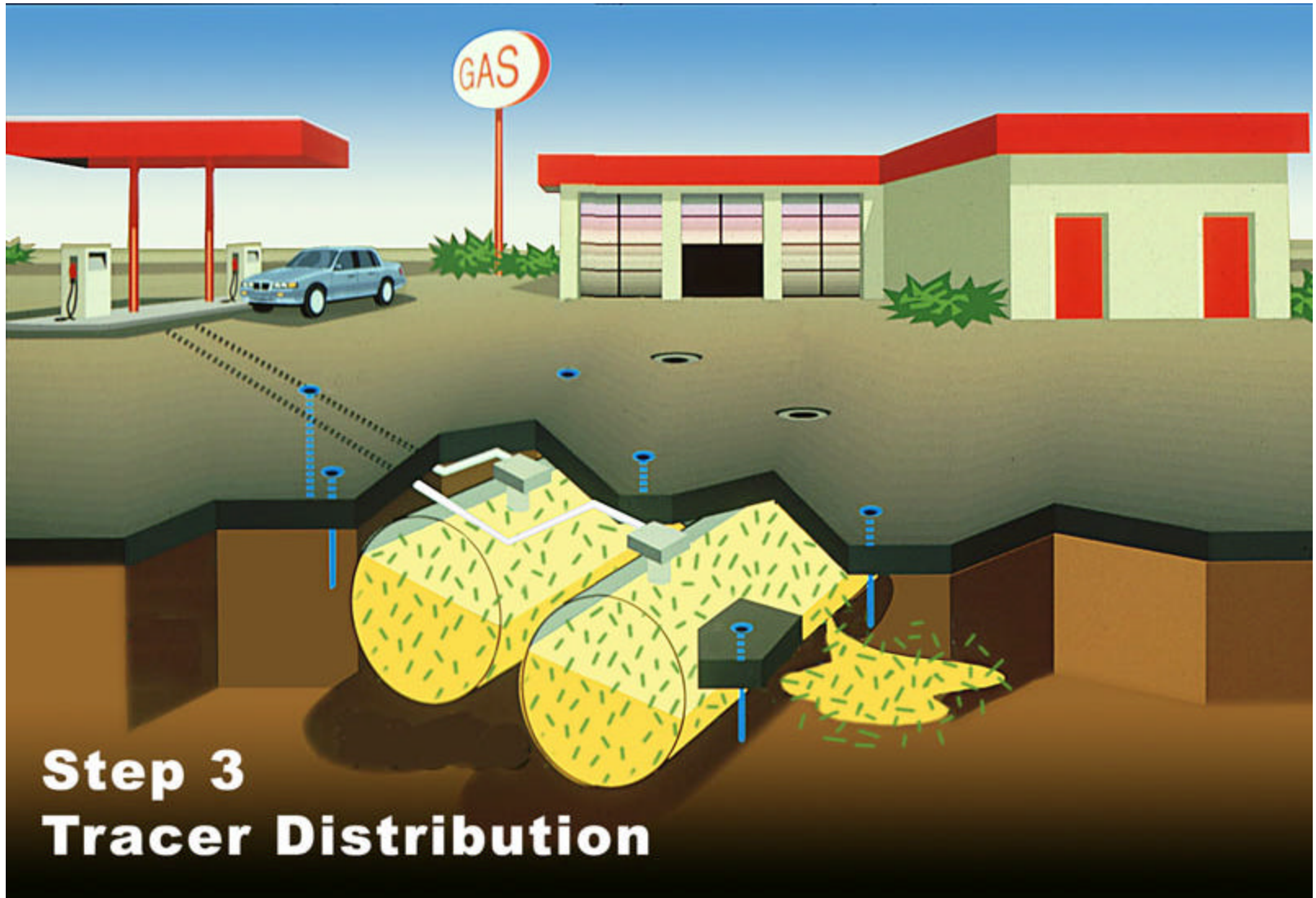




Inoculation



- Each UST inoculated with separate tracer compound
- Tracers identified by distinct letters (i.e., A, B, R, etc.)
- Enough tracer added to allow for dilution of tracer with new deliveries





Sample Collection



- Vapor samples collected from each probe location
- Samples analyzed for tracer & TVHC

Field-Based Research Project



- Sacramento & Yolo Counties
- San Diego County
- City of Temecula (Riverside County)

The FBR Project



- Goal: To quantify probability and environmental significance of releases from new and upgraded UST systems
- Mandated by Senate Bill 989 (1999)
- Report Completed June 2002

Project Objectives/Purpose



➤ Comparison of three major UST system groups

✕ Identify system component(s) most likely to cause a release

✕ Estimate environmental significance (vapor versus liquid release)

✕ Assess effectiveness of leak detection information

Project Background



- Key Players:
 - State Water Resources Control Board
 - University of California, Davis
 - Tracer Research Corporation
 - Local Agencies
 - Local Air Districts & CARB
 - Regional Water Quality Control Board
 - Owners/Operators of Randomly Selected UST Facilities

Field Testing of UST Systems

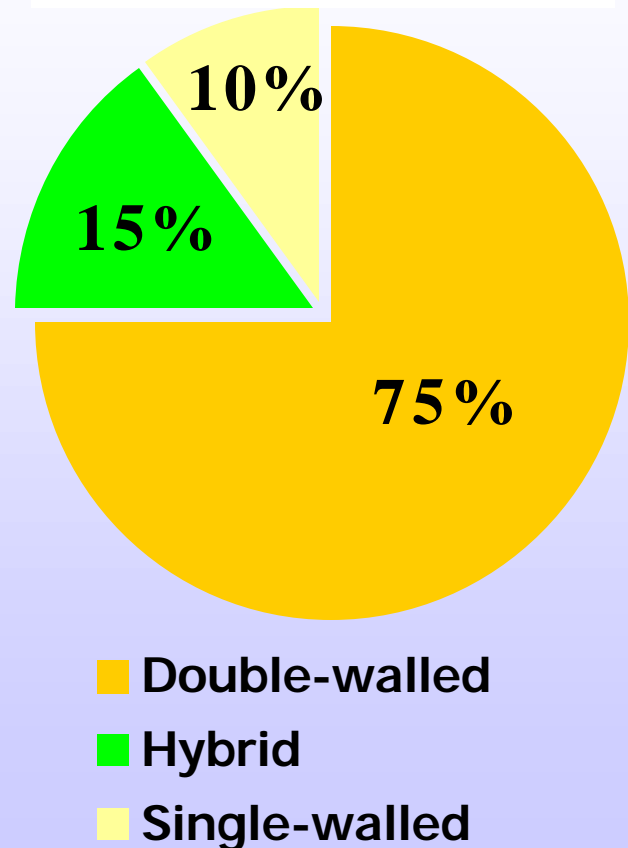


- Performed by Tracer Research Corporation
- Enhanced Tracer Tight® method performed on each UST system at each randomly selected UST facility

Distribution of UST Systems

- Total: 182
(at 55 facilities)
- Double-walled:
137 (75%)
- Hybrid: 27
(15%)
- Single-walled: 18
(10%)

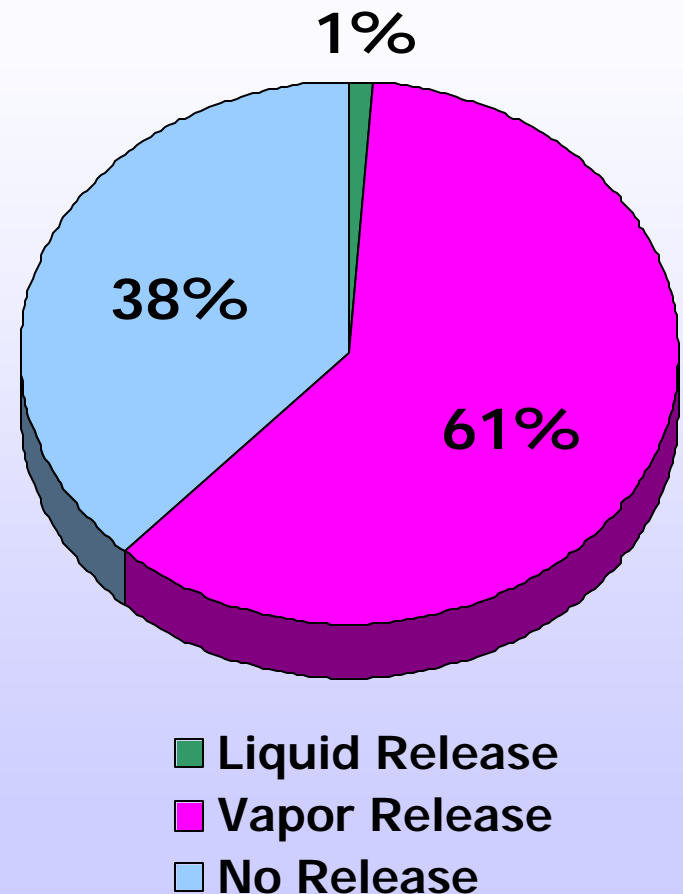
**UST System Type
Breakdown**



Data by UST System

- Total UST Systems Tested: **182**
- UST Systems with **NO Release: 70 (38%)**
- UST Systems with **Suspected Vapor Release: 112 (61%)**
- UST System(s) with **Liquid Release: 1 (1%)**

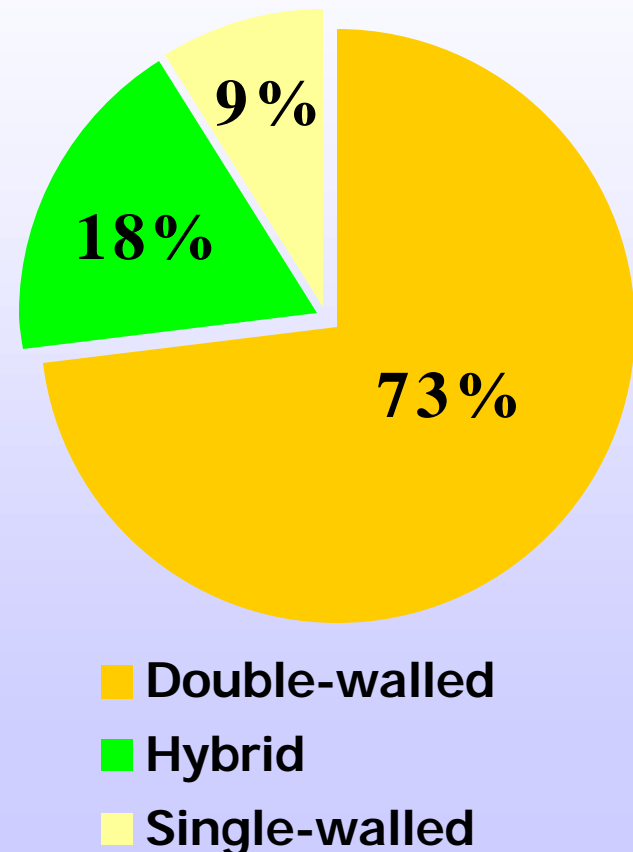
UST System Data



Distribution of UST Facilities

- Total: 55
(with 182 systems)
- Double-walled: 40
(73%)
- Hybrid: 10
(18%)
- Single-walled: 5
(9%)

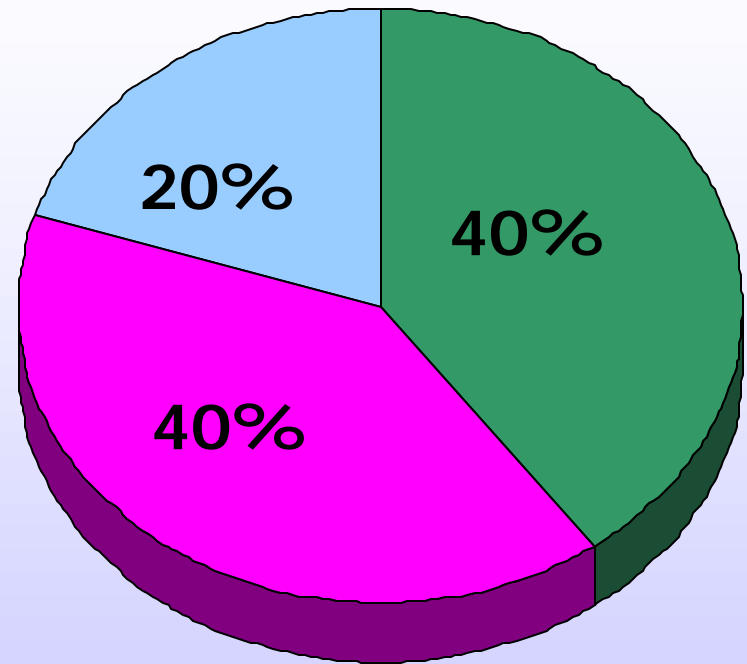
**UST Facility Type
Breakdown**



Data by Facility

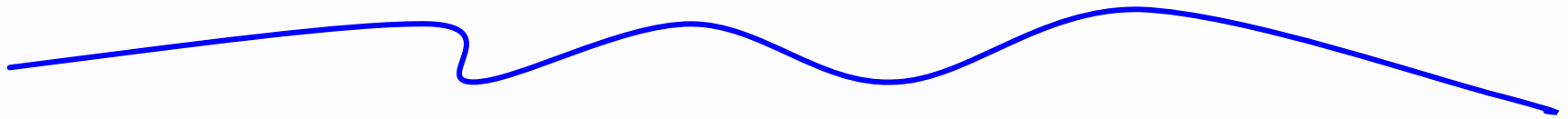
UST Facility Data

- Total UST Facilities Tested: **55**
- UST Facilities with **NO Detections: 11** (20%)
- UST Facilities with **Mixed Detections: 22** (40%)
- UST Facilities with **All Detections: 22** (40%)



■ All Detections
■ Mixed Detections
■ No Detections

Tightness Frequency by Tank Type



Tank Type

Tracer ND

Pass %

Double-walled

54/89

60.7%

Single-walled

17/23

69.6%

Tracer Detection vs. Vapor Recovery System Type



System Type	Fail/Total	Fail %	Tracer Average
Balance	57/91	63%	1.24
Assist	55/91	60%	3.24

Re-test System Performance



- Systems re-tested - 34
- Systems passing - 6
- Percentage - 18%

Spill Bucket - Hydrostatic Test

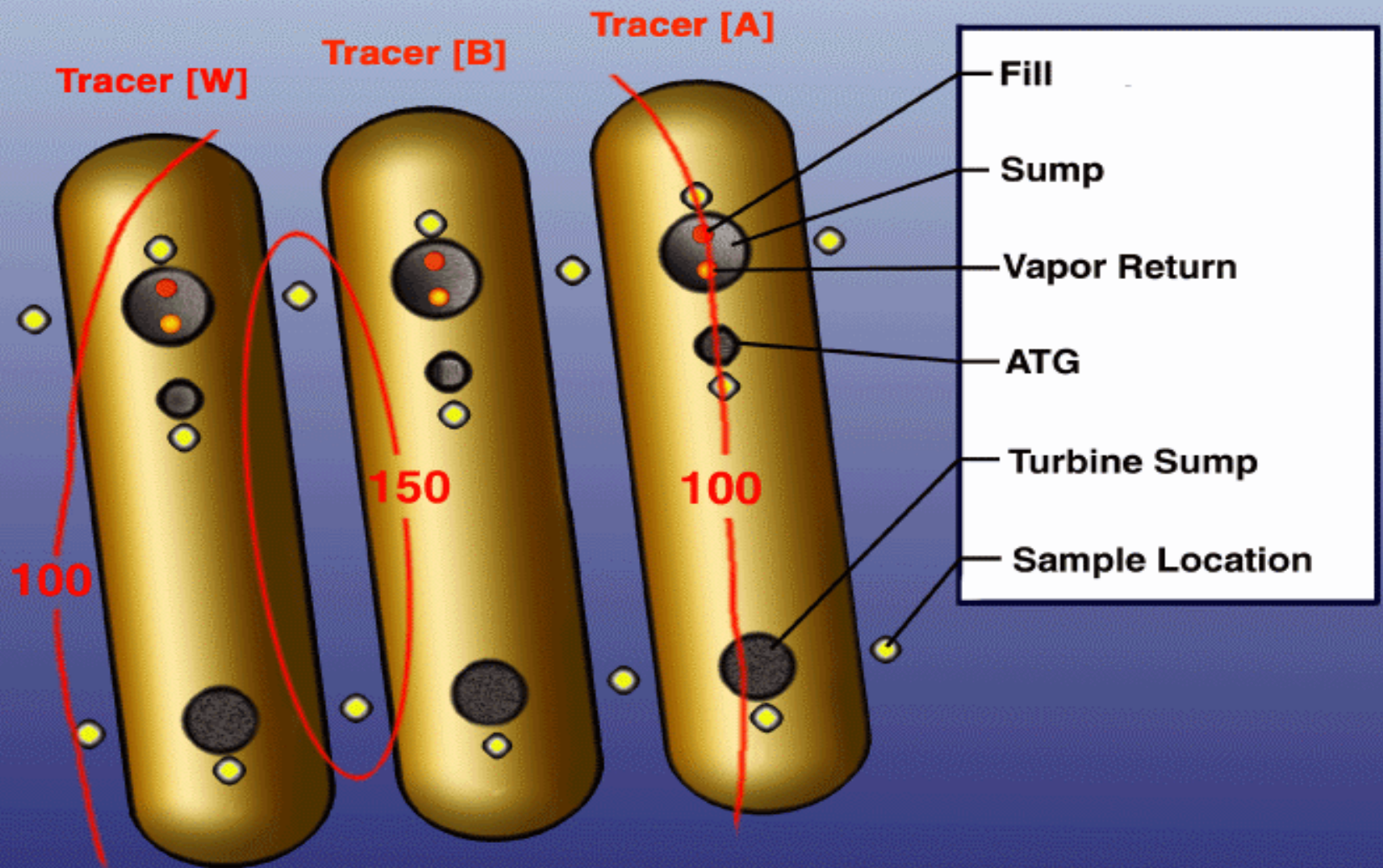


- Total of 182 Spill Buckets Tested
 - 82% Passed (150/182)
 - 18% Failed (32/182)

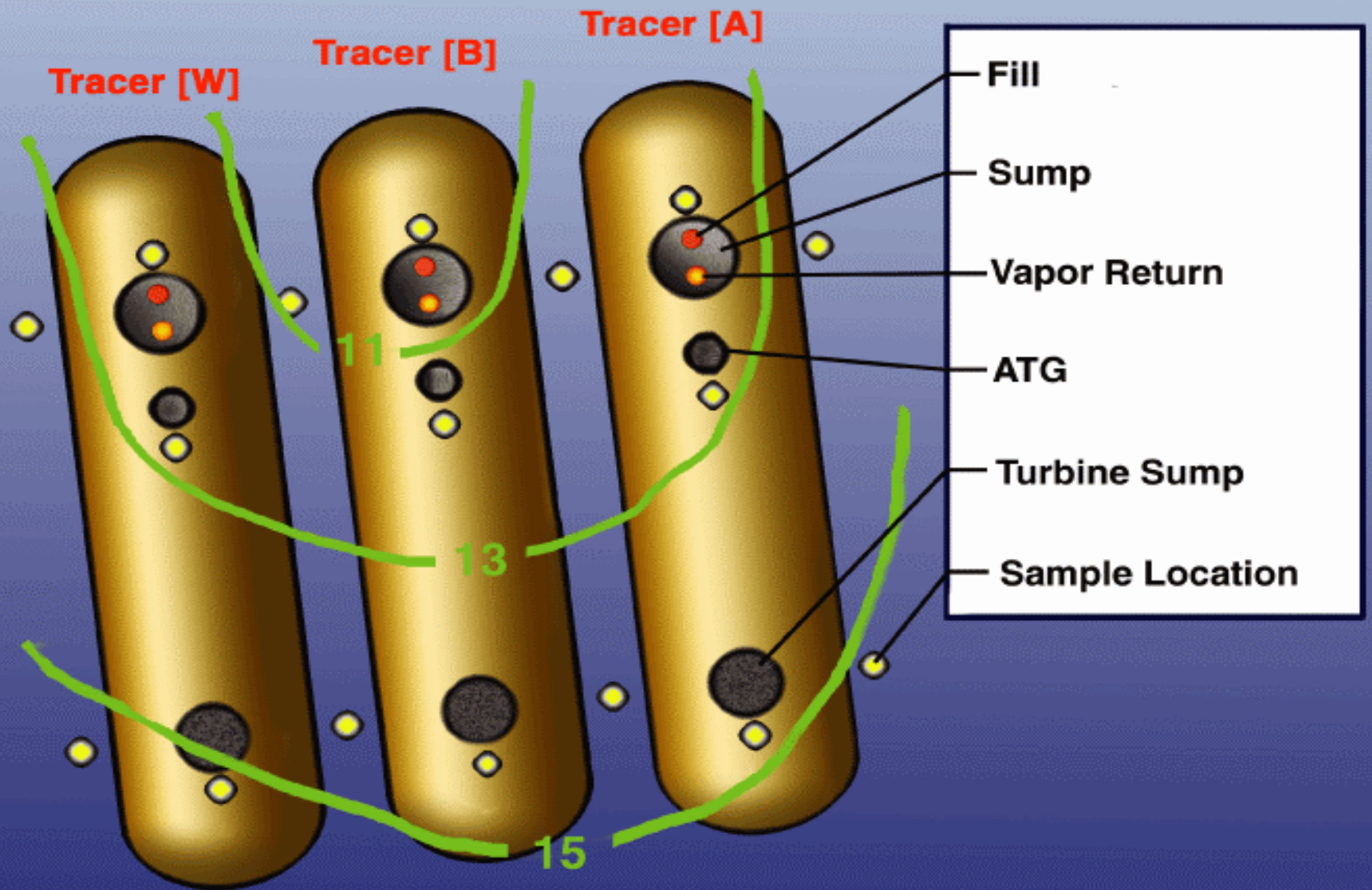
Case Study #1



- Large vapor release suspected based on TPH and tracer concentrations
 - TPH: 164 mg/L
 - Tracer: 30 ug/L
- Tank essentially venting to backfill
- Release point: Faulty drain valve into fill riser spill bucket, via separated joint in spill bucket into containment sump, out top of containment sump & underneath manhole cover into the backfill



Hydrocarbon Vapor Distribution

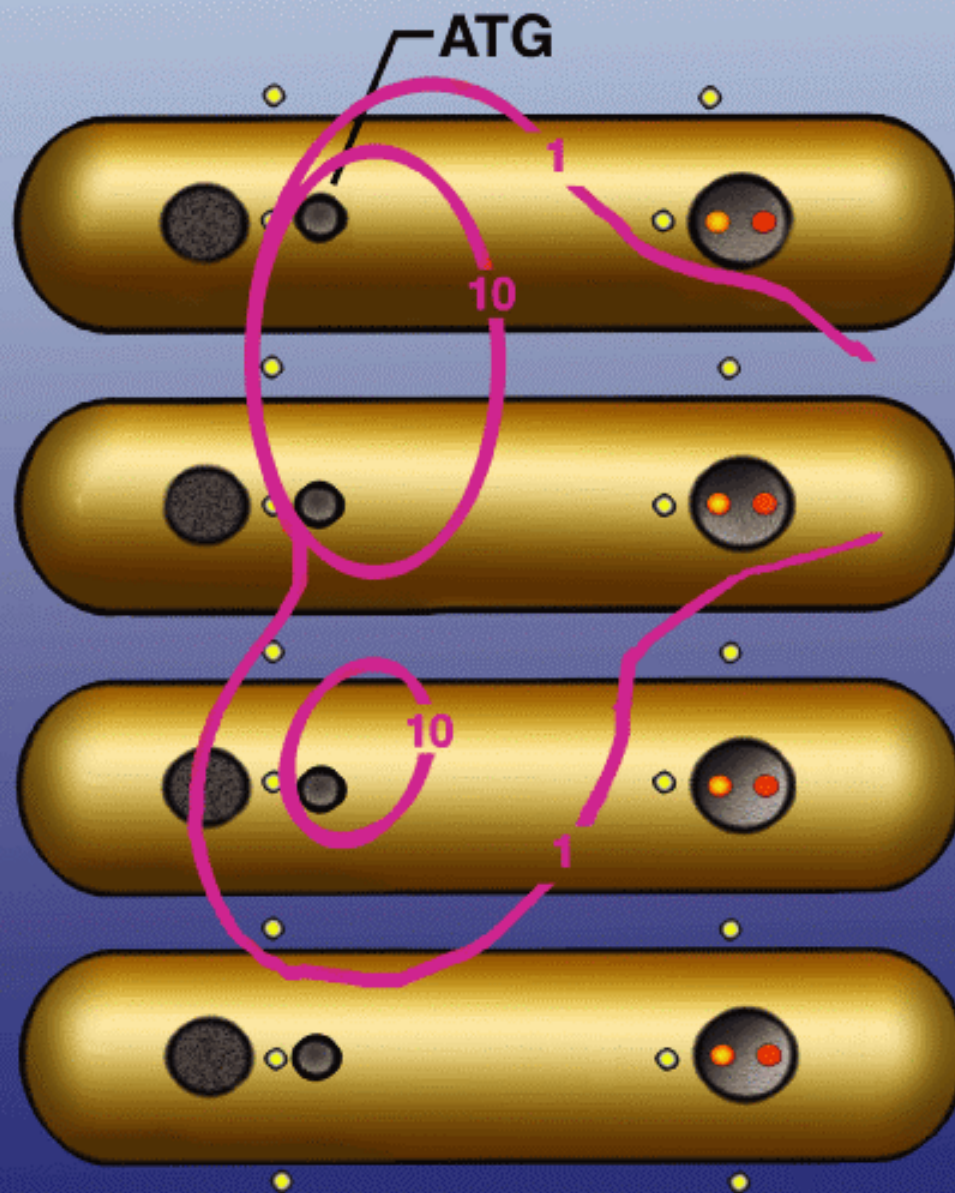


Tracer B Distribution

Case Study #2



- Vapor release at each gasoline tank
ATG cap, no release from diesel tank
- Gasoline tanks missing o-ring for cable penetration and under pressure from pressure release vent cap
- Diesel tank, o-ring present and tank not under pressure



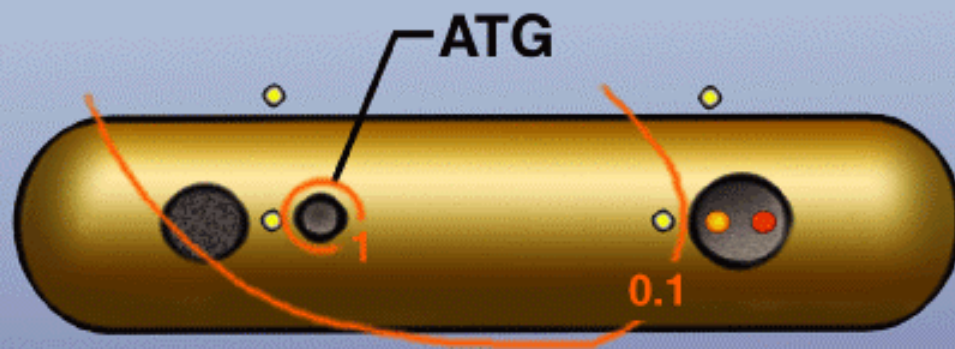
Tracer [W] - Super

Tracer [A] - Unleaded

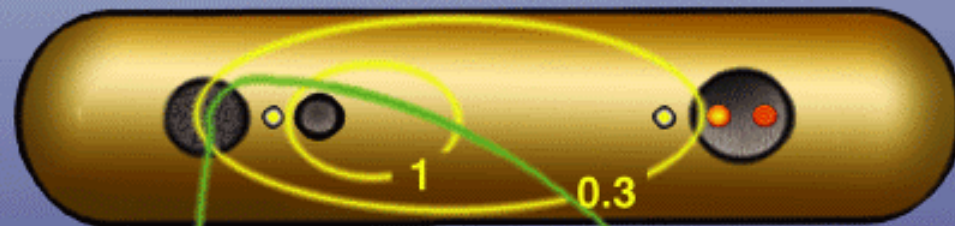
Tracer [R] - Plus

Tracer [B] - Diesel

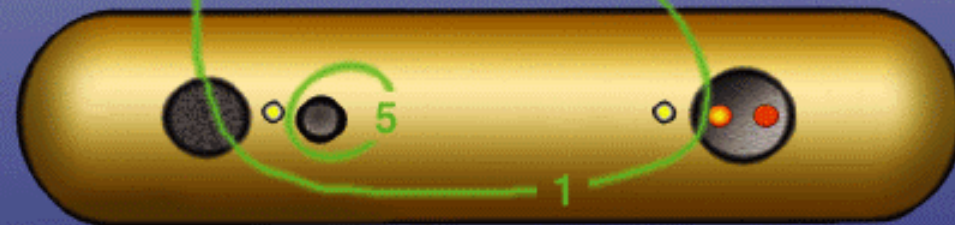
Hydrocarbon Vapor Distribution



Tracer [W] - Super



Tracer [A] - Unleaded



Tracer [R] - Plus



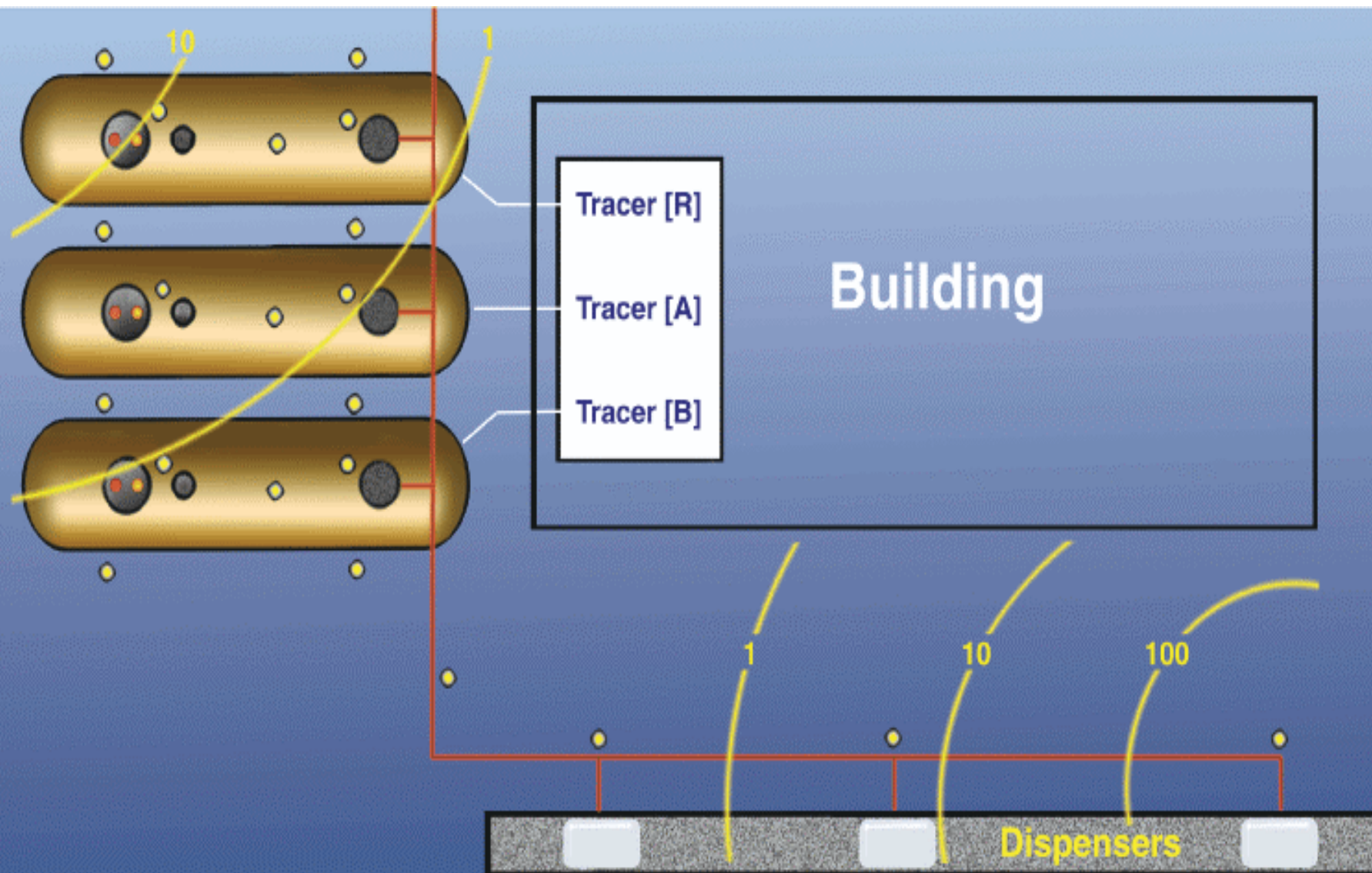
Tracer [B] - Diesel

Tracer Distributions

Case Study #3



- Liquid release suspected based on TPH and tracer concentrations
 - TPH: 114 mg/L
 - Tracer: 0.16 ug/L
- Original results confirmed by re-test and helium test
- Release point: SW piping connection just outside UDC, where rigid FRP pipe connects to flexible piping



Hydrocarbon Vapor Distribution

Vapor vs. Liquid Releases



Release Type	Tracer Level	TVHC Level	Retest TVHC	Time Lapse
Vapor	30	164	< 0.05	2 mos.
Liquid	0.16	114	2	3 mos.

FBR Project Report



- Completed May 31, 2002
- Available on-line at:
<http://www.swrcb.ca.gov/cwphome/ust/docs/fbr/index.html>

Other Field Evaluations



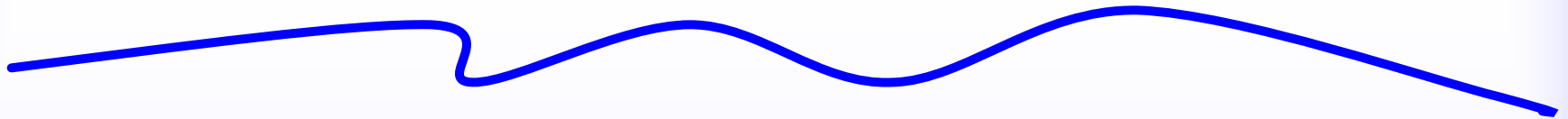
- Sensor Study (789 Sensors; 124 Facilities):
 - 12% with problems
 - 5.6% failed to alarm
- Secondary Containment Testing:
 - Failure rate of UDC and sumps varies from 25% - 50% depending on pre-testing

Other Field Evaluations



- Line Leak Detection(LLD) & Automatic Tank Gauge (ATG) Study:
 - Ongoing
- Compatibility & Permeability Study:
 - Contract with UC Davis
 - Ethanol-blended fuel

2003 CUPA Conference



February 4-5, 2003

Anaheim Marriott Hotel

www.calcupa.net

Future SWRCB Contacts



- Secondary Containment Testing:
 - Mr. Raed Mahdi, 916-341-5871
- Sensor Study:
 - Mr. Scott Bacon, 916-341-5873
- FBR, LLD & ATG Study, Comp/Perm:
 - Ms. Erin Ragazzi, 916-341-5863
- Everything:
 - Ms. Shahla Farahnak, 916-341-5668

Thank You



Any Questions???

